

# White Paper Report

Report ID: 104705

Application Number: PF5013911

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Institution: Litchfield Historical Society

Reporting Period: 10/1/2011-9/30/2013

Report Due: 12/31/2013

Date Submitted: 12/16/2013

White Paper  
PF-50139-11

**Improving Environmental  
Conditions to Preserve Collections**

Litchfield Historical Society  
December 16, 2013

The Litchfield Historical Society received a 2011 Sustaining Cultural Heritage Collections Implementation Grant of \$320,000 from the National Endowment for the Humanities to execute specific recommendations from a planning team to create a preservation environment that provides the best possible conditions for the perpetuation of the collection with the least possible consumption of energy. This grant project focuses on implementing passive alternatives to costly energy consuming HVAC systems including repairs to the exterior of the buildings to minimize water and air infiltration; refurbishment of lighting and shelving in collections storage spaces; and widening temperature and relative humidity parameters to minimize the use of HVAC systems. When repairs, refurbishments or replacements to the HVAC system are necessary, the Society focused on finding the most cost effective and energy efficient solutions.

The Society owns and occupies four buildings that are integral to the architectural fabric of the town of Litchfield. The Noyes Memorial Building, constructed on Litchfield's green in 1901, is the only Beaux Arts building in town. The Tapping Reeve House (1774) and the Litchfield Law School (1784) the first law school in America are National Historic Landmark sites and rank among the most historically important properties in Connecticut. In 2007, the Society completed construction on the Pamela Cunningham Copeland Curatorial Center located behind the Tapping Reeve House. This state of the art collections storage facility resembles an 18<sup>th</sup> century barn on the exterior seamlessly blending the building into the historic fabric of the site.

## **Planning Grant**

In the summer of 2010, the Litchfield Historical Society received a \$39,500 National Endowment for the Humanities Sustaining Cultural Heritage Planning Grant. The grant funded work by Fasey-Smith Architects to assess the exterior of all four museum buildings, Fuss & O'Neill engineers to provide a diagnostic assessment of the HVAC systems, and Rick Kerschner, Director of Preservation and Conservation at the Shelburne Museum to inspect the health of the collections and advise the staff on appropriate environmental parameters for the collections' spaces

Each consultant visited the museum individually during the summer and early fall of 2010. The society's curator worked closely with each consultant providing them with blueprints, information on each building's history, environmental readings for the various spaces, and unlimited access to

each building. Each consultant also met with Joe Guenther, owner and operator of LHS' contract HVAC company.

## **Implementation Project Activities**

The planning team identified moisture infiltration as an urgent concern for the Noyes Memorial Building and this became one of the motivating factors behind the implementation grant project. Deterioration to the brickwork and limestone on the building had allowed moisture to penetrate to the interior of the building, damaging plaster walls and elevating humidity levels in collections storage rooms and galleries. Planning consultant Richard Kerschner noted in his report “tightening and improving the building structure to prevent water entry and improve the thermal characteristics of the building is a critical first step to improving interior environmental conditions.” The humidity levels in the building could never be properly maintained or controlled until the exterior repairs remain incomplete. Energy was wasted as the HVAC system was taxed to continually condition overly humidified air infiltrating the space. Several important grant activities addressed these concerns.

- **Repair mortared joints in the brickwork and the limestone cornices, entablatures, friezes, bands columns and pilasters as necessary to stop water infiltration.**

The brick and stonework repair was part of a much larger project to replace the roof, gutters, and leaders on the Noyes Memorial Building. The roof project included replacing the 1920's era standing seam lead-coated copper roof and replacing all of the decorative lead coated gutters and downspouts. The Noyes Memorial Building is a contributing building to the Litchfield National Landmark district so all of the work replicated the original in kind. The work on the roof began in the summer of 2011 and the project was completed in January 2012. The mortar replacement on the brick and stonework was integral to the larger roof project and was critical completed at the same time. The building has now been through two hurricanes, several recording breaking snowstorms and a very wet spring and summer with absolutely no water infiltration.

The work on the exterior of the building was only the first step in gaining control of temperature and humidity. The HVAC system in the building was installed in 1990 and in addition to being taxed beyond its capabilities, it was past its useful life.

- **Refurbish HVAC system at Noyes Memorial Building, install a new chiller and undertake minimal repairs to the HVAC system at the Tapping Reeve House.**

During the planning project Joe Guenther, Society HVAC technician and the other consultants concluded that the exterior chiller had to be replaced. Under this grant Guenther replaced the chiller with a smaller, quieter and more energy efficient model. At the same time he undertook a program to repair, tweak or replace the air handlers in the building. He paid particular attention to opportunities to under utilize or even turn off specific air handling units to maintain desired conditions while saving energy. Guenther also made alterations to the boiler and heating system to make them more responsive to exterior temperature and at the same time upgraded the interior thermostats to provide better internal control. Kushner created seasonal temperature and humidity schedules for each building and made suggestions as to how the HVAC systems could be manipulated to more efficiently maintain these parameters The Curator has adopted these schedules for each building and already begun the implementation of these wider parameters in the museum spaces.

- **Purchase PEM2 data loggers developed by the Image Permanence Institute (IPI).**

Once the work on the building and HVAC system was complete it became critical to install a monitoring system that is simple to operate and interpret. This grant funded the purchase of PEM2 data loggers developed by the Image Permanence Institute (IPI). The IPI also created the Website [www.PEMData.org](http://www.PEMData.org) to support the data retrieved from the PEM2 data loggers and enable museum staff to accurately analyze the information gathered by these devices. Museum conservator and consultant on this project Rick Kerschner recommended the Society purchase 10 PEM2 loggers, five for the Noyes Memorial Building, three for the Curatorial Center and two for the Tapping Reeve House. The curator has been monitoring conditions for over a year and now has a solid base line of optimal temperature and humidity. The dataloggers flagged one incident in the collections storage, letting the curator know that the de-humidifier was off line. The problem was fixed immediately with no adverse affects to the collection. The curator feels sure that she will be able to monitor and stay on top of any temperature and humidity issues in the buildings.

- **Install compact shelving in the Collections Storage room in the Noyes Memorial Building.**

The grant funded the cost of compact shelving in the Collections Storage room and the supplies needed to transition oversized flat textiles from boxes to rolled storage and to rehouse a portion of the personal artifact collections. Prior to the grant project the artifacts housed in this space were organized on non powder-coated metal shelving of two different types acquired over the years and not designed for museum storage. These racks, especially the oversized shelves currently holding textile storage, were arranged closely together to maximize space, creating narrow aisles and logistical challenges when extracting a box from a shelf. With only three shelves per oversized rack, the textiles boxes were stacked four and five boxes high.

The room configuration also had storage racks placed directly in contact with the baseboard heaters that run around the perimeter of three sides of the room. While rarely used, these heaters provide the only source of heat for the space and cannot be removed. The new compact shelving is designed with a minimum of a 12" gap between the end of a shelving unit and the baseboard heater. This allows the heated air to circulate more freely around the room and not be in direct exchange with either the shelving or the collections.

The cost of shelving included the installation of the tracks and six compact shelf units. Each unit is five feet wide and approximately 85" high. These units are designed to hold over 500 textile boxes each measuring 30" long x 17" wide x 6" deep. LHS currently stores 375 textile boxes and 111 additional textile and personal artifact boxes ranging in size from 16 1/2" x 20 1/2" x 3 1/2" to 10 1/4" x 12 1/4" x 3". The remaining space allows for future donations to the collection as well as expansion of currently overcrowded boxes. In addition to the units on tracks, two stationary rolled textile racks will be installed in the Collections Storage room. These racks will house the Society's quilt, flag and oversized flat textile collections which are currently boxed. The grant also funded storage supplies such as tissue paper, batting, cotton twill tape and boxes to re-house specific personal artifact collections and transition oversized textiles from boxed to rolled storage.

The new shelving was installed in March 2012 while the museum was closed for the winter months. The staff moved the textile collection to temporary storage in a gallery and

transferred all non textile items to the Pamela Cunningham Copeland Curatorial Center, the Society's main collection storage facility. The compact shelving was delivered and installed over a two week period. While the collection was in temporary storage in the gallery the curator re-housed some items and organized the boxes for the new space. Once the shelving was installed the curator was able to move the textile collection back into the room and re-shelve it in a logical and organized manner. The new shelves provide ample workspace for the curator and room for the collection to grow. The Society used funds from another grant project to hire a curatorial assistant for the summer of 2013. Her projects included re-housing portions of the personal artifact collection and completing an inventory of the textile collection. The new storage area made her work much more efficient. (Appendix B – Before and after images of collections storage)

- **Update lighting in exhibition and storage spaces in the Noyes Memorial Building**

A project to replace outdated, heat intensive and energy costly lighting in the Noyes Memorial Building was the final grant project. The track and canister system used in the building was installed in 1991 and while state of the art at the time, these canisters were energy drain and negatively impacted the museum environment.

The existing track and canister system used a magnetic connection system which allowed the transfer of energy from the track to the light. The magnetic connections were unstable and on average lost 30% of its energy during the transfer. The replacement system uses LED lighting with an electronic connection. The lights use less energy, emit significantly less heat and almost entirely reduce the energy loss from the magnetic connections. The lights were updated in the Noyes Memorial Building's exhibition galleries and collections storage rooms

## **Section 106 review**

As the Noyes Memorial Building is a contributing building to the Litchfield National Landmark Historic District, portions of this project (brick and stone work and new chiller) were subject to review under section 106 of the National Historic Preservation Act (NHPA) of 1966. The Society received a ruling from the Connecticut State Historic Preservation Officer which stated that the project “clearly meets the Secretary of the Interior’s *Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings*. Thus, the undertaking will have no adverse effect on cultural resources.” As required by Section 106, NEH is provided the public with information about this

project, as well as an opportunity to comment on any knowledge of, or concerns with, historic properties in the proposed project area, and issues relating to the project's potential effects on historic properties. The section 106 statement was on the Society's web site and the NEH contacted consulting parties. Neither the Litchfield Historical Society nor the NEH received any comments during or after the comment period.

## **Outside Funding**

The grant from the National Endowment for the Humanities was a critical piece in putting together a funding package for the repairs to the Noyes Building and the Tapping Reeve House and Law School. The Society received a \$385,000 grant from the Seherr-Thoss Foundation to fund the roof and gutter repairs as well some interior updates including new carpet in the galleries and offices, and plaster repair and paint in the galleries. The award also helped to jump start a small capital campaign to fund repairs at the Tapping Reeve House and Law School and start a maintenance endowment. To date the campaign has raised 650,000 (of a 1 million goal) and has funded \$180,000 in painting, roof work and structural repairs to the Reeve House and Law School. Once the campaign goes public in the spring we are certain we will raise the remaining funds for the endowment.

## **Publicity**

The Historical Society staff posted regular up-dates on the project to our website and facebook pages and featured the progress in the quarterly newsletter. Catherine Fields, the Society director, participated in an NEH sponsored panel at the 2013 American Association for State and Local History Annual Meeting. Over the course of the project the society sponsored several members "behind the scenes" programs to show the new storage areas and upgrades to the galleries. Publicity generated by the project helped society members and the general better public understand the long term needs of the collection, the great costs incurred in caring for collections and the Society's commitment to energy savings and to lowering our carbon footprint.

## **Long Term Impact**

- **Energy Savings**

The Litchfield Historical Society has seen astonishing energy savings from this project. Over the past three years with the new energy efficient chiller, tweaking the HVAC system in the building, installing the new lighting, and following the conservators recommendations for



appropriate temperatures in storage areas the Society's overall electric bill has dropped from \$ 41,234 per year to less than \$ 17,423 in 2012. Every electric bill we have received in the past three years has been lower than the bill for the same month in the previous year. The project has lowered energy costs, reduced the society's carbon footprint and provided much better care for our collection.